AGRICULTURAL NEWS LETTER

VOL. 27, NO. 1 WINTER 1958-1959

This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations by the Du Pont Company. It also contains published reports of investigators at agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.

DU PONT
REG. U. S. PAT. OFF.

ISSUED BY PUBLIC RELATIONS DEPARTMENT, E. I. DU PONT DE NEMOURS & CO. (INC.), WILMINGTON 98, DEL.

AGRICULTURAL NEWS LETTER

Published Quarterly by the Public Relations Dept.
E. I. DU PONT DE NEMOURS & COMPANY (INC.)
Wilmington 98, Delaware

THE AGRICULTURAL NEWS LETTER serves a medium of reporting new developments and ideas in agriculture, particularly those related to advancements through research. Material herein may be reprinted, in whole or in part, in the interest of advancing the general knowledge of new agricultural practices.

This publication is available on microfilm from University Microfilm, 313 North First Street, Ann Arbor, Mich., at $1.50 per volume, plus 10 cents for packaging and mailing.

OTTO J. DEKOM.....*Editor*

Customer-Tailored Turkeys

Time was when turkey on the family menu required a grand holiday feast with all the relatives from 20 miles around gathered at the festive board. A 25-pound roasted tom didn't look properly proud unless surrounded by an equal number of poised forks. Furthermore, if a small family essayed a turkey dinner, it was doomed to two weeks of leftovers that made "turkey" a hated word for months to come. So, gobbler growers found their markets largely limited to special buying at Thanksgiving or Yuletide.

Today, the turkey on the average dinner table has changed, and so has the dependence on special marketing seasons that once plagued turkey fanciers. An evolution in the size and structure of the kingsize fowl is partly responsible. While mountainous toms are still available for family-reunion sized gatherings, the development of several special breeds such as the Beltsville now makes it possible for the housewife to find turkeys of every weight from four to 40 pounds. In addition, modern packaging and processing improvements make it feasible to sell halves, wings, breasts, and other favorite sections. The working housewife is especially fortunate in being able to buy complete heat 'n' serve dinners including several slices of pre-cooked turkey white meat. As a consequence of these changes, turkey sales have shot up from 34 million to nearly 80 million in the last 10 years.

Adapting a product to meet varied customer needs is a lesson equally significant in industry, as Du Pont's own experience demonstrates. When nylon was new on the market, it was offered in three deniers; now it is available in more than a hundred sizes and styles for dozens of applications. Cellophane, to take another example, is now offered in more than a hundred types of thickness, moistureproofness and heat sealability. In both cases, markets have been greatly expanded as customers found additional uses for these products.

In the years ahead, for any American enterprise from business to farming, improved sales and continued success will more often than not depend upon the knack demonstrated by the turkey growers: Being able to shape one's product to fill consumer needs and desires.

IN THIS ISSUE

tests for MERCURY SEED TREATMENT

By T. C. RYKER, Ph.D.
Grasselli Chemicals Department
E. I. du Pont de Nemours & Co. (Inc.)

Constantly expanding use of seed disinfectants and introduction of improved liquid mercury seed disinfectant have emphasized the need to develop a test for quality of treatment and distribution of the disinfectant on individual seeds accurate enough for law enforcement agencies and simple enough for field use. When dry formulations of disinfectant in dust or slurry were common, the simple kerosene-and-alcohol test was used to indicate the gross amount of chemical present. Since the dye used in disinfectant was soluble, the intensity of color provided a gauge for measurement of the presence of mercury.

In the case of liquid mercurial treatment—such as "Ceresan"* liquid seed disinfectants—the dye indicates only the *initial* distribution. The chemical is volatile and a redistribution process takes place for several days after treatment, without any change in the dye distribution. The fumes that are given off by the chemical are reabsorbed, giving better coverage of the entire batch. This ability to absorb and retain mercury is, in fact, a substantial advantage, because stability in storage is provided thereby, as well as providing diffusion in the soil after planting.

Chemical Method

Both the chemical and the biological approach are being used in the studies to develop a method of testing for seed treatment. The methods which have been developed up until now require facilities usually found only in laboratories—and the results are not uniform.

Basically, the chemical method consists of a determination of the amount of mercury in the seed sample. One limitation is that it establishes the total amount of mercury, but not the distribution of the disinfectant on individual seeds, the chief factor in the effectiveness of treatment. The chemical analysis is difficult, even for trained technicians, and the seed must first be digested with acid to separate its organic material from the mercury compound. Researchers studying this approach have found difficulty in accounting for the discrepancy in the quantity of mercury detected and the amount expected on the basis of the treatment to which the seed was subjected.

Du Pont trademark.

Biological Method

The biological method is designed to meet the basic deficiency of the chemical analysis by providing a reasonably accurate measure of the condition of individual seeds. In effect, the bioassay is a transplantation to the laboratory of what happens in actual practice: Seed in treatment is judged by the performance of the treated seed. In the field, the seed is planted and produces a plant. In the laboratory, individual seeds are placed on agar plates inoculated with a fungus.

After incubation for 24 to 48 hours, the fungus has grown and produced a cloudy area where treatment is not effective. On the other hand, where the fungicide has diffused, fungus growth has been inhibited and the area is clear. A measure of the degree of treatment is derived from the circumference of clear areas around individual seeds. It is perhaps possible to standardize this test by treatment of samples with predetermined disinfectant rates and storing in sealed containers for three days.

The Association of Official Seed Analysts has organized a study group to examine methods of detection and measurement for seed treatment. This work will probably be coordinated with the studies undertaken by both commercial firms and the experiment station.

HUNTING FILM AVAILABLE

A "hound-dog documentary" film is available from the Remington Arms Company for showing to clubs or associations interested in hunting. There is no narrative—the whole story is a banjo-packed folk ballad, plus a hunter's few comments to his dogs. For free showing write to: MPO Productions, 15 East 53rd Street, New York 22, N. Y.

By DONALD C. BOUGHTON, Ph.D.
Grasselli Chemicals Department
E. I. du Pont de Nemours & Co. (Inc.)

With racketeers facing legislative committees and grand juries, it is only logical that the appropriate committee should look into the operations of those insect racketeers who daily plunder the rich harvest of crops and livestock grown by the farmers of America. Here is an exclusive transcript of the hitherto secret hearings of the Cattle Grub Racket Committee. Appearing under subpoena is Cattle Grub, gang leader.

Q: Please tell the Committee your name.

A: Cattle Grub. Technical name *Hypoderma*, which means under the skin. We're known as warbles, wolves, heel flies, warble flies, ox-warble flies, gadflies, and bomb flies.

Q: Are you a fly?

A: Yes. My maggot stage is the grub.

Q: What do you do for a living?

A: I'm a parasite of cattle.

Q: Indeed! And what is a parasite?

A: An organism that lives on or in an organism belonging to another species, at the latter's expense. In my case, cattle: They are my food and shelter — my host.

Q: How do you go about being a parasite?

A: I'm a bi-sexual insect of the fly family. In my adult phase I don't eat. I have no mouth parts. I am free-living (that means non-parasitic) and my chief concern is reproduction. For the one week allotted us, we heel flies lead a lively life. Male flies chase female flies. After mating, the female flies chase cattle, on which the eggs are deposited. The eggs hatch in less than a week. From each, a tiny white larva or maggot emerges and burrows through the skin of the host. This marks the beginning of my parasitic phase.

Q: I assume one host can harbor several larvae.

A: Yes, depending on the number of eggs deposited, from a few to a hundred or more.

Q: What do the larvae do inside the host?

A: Feed and grow. They move about slowly. They store up food to carry them through the coming non-parasitic period outside the host's body. This takes about nine months. At the end of its migration, the larva arrives at the back of the animal, where it makes a hole through the hide for breathing. A pocket of host tissue forms around the larva, which then grows rapidly, causing a swelling. After about five weeks in the cyst, the larva—now about an inch long and dark colored—works its way out of the host's back and drops to the ground, where it becomes a pupa. Pupation is affected by temperature, the adult flies emerging in from six to 10 weeks.

Q: What about damage? Is a parasite concerned about injuring or robbing its host?

A: No! Parasitism is an accepted and respected way of life in the animal kingdom. The body of the cow is my environment. Does corn regret "robbing" the soil?

Q: Then you're not concerned at all about how badly you damage your host?

A: Well, there is a practical limit, of course. We grubs need the host to maintain and propagate ourselves. It wouldn't make sense to be so destructive as to wipe out cattle. That would be race suicide for us.

Q: Mr. Grub, how about the fact that your host is an animal of great economic value?

A: Of course, when we chose the bovine, we could not foresee it would become of such importance to civilized man. But domestication of cattle actually has benefited us by insuring an adequate and easily accessible supply of hosts. Man is our sharecropper. We take our share in food and shelter; he takes his in what milk, beef, and hides we can spare.

Q: Is domestication a threat to you?

A: There is a threat: That the desire for efficiency will become great enough to mobilize the livestock and related industries.

Q: Is this now a serious threat?

A: Possibly, but our defense strategy has prevented eradication campaigns so far.

Q: Just what is the nature of this strategy?

A: Common sense parasitism. Live and let live. Play it soft, with widespread, insidious infection but no spectacular outbreaks. Don't threaten human health or panic the livestock industry. Look at brucellosis and foot-and-mouth disease—they haven't a chance, with all the attention they attract. I say: Keep it hard to prove. "Statistically significant" . . . there's a phrase we parasites love!

Q: But we think highly of statistical proof.

A: Precisely, Mr. Chairman, and when you don't have it, you fumble. Consider this:

1. **Active participation of growers is paramount in campaigns against grubs.**
2. **Farmers would have an incentive to get rid of grubs if shown they would profit.**
3. **Evidence could come from field tests showing that profits on grub-free (or lightly infected) are greater than on heavily infected cattle.**
4. **Such evidence, to be effective in soliciting farmer participation, would have to be "statistically significant"—which is to say there must be reasonable certainty that the extra profit from grub-free cattle is not a matter of chance.**

Q: I don't get the point.

A: I haven't got to it yet. The point is that by making it difficult to get sound evidence proving we do rob the farmer, we stifle campaigns against us before they start.

Q: How do you make it hard to get evidence?

A: By wide-spread infection involving millions of cattle and by great variation in the severity of infections. This makes it necessary to study large samples of the cattle population to make statistical sense. We're content with a modest share. If it's expensive, time-consuming, and frustrating to figure our take, so much the better for us.

Q: You are aware man could wipe you out?

A: Yes, but knowing is one thing, doing is another. You could slaughter all cattle—that would fix us. But you won't do that.

Q: How about rotenone?

A: Theoretically, rotenone could do the job. But rotenone kills grubs only by direct contact. Somebody would have to see to it that a pinch of this stuff came in contact with the rear end of all larvae piercing the hide during the last grubby season of an eradication program. To date, the incentive to treat on the necessary wide-spread scale hasn't been great enough to give us cause for worry about rotenone.

Q: You mentioned lack of incentive. I assume you refer to the farmer?

A: Who else? Cattle are his property during the period grubs are active. He must do the work in any grub control program. You've never heard of a leather manufacturer dashing out to treat cattle.

Q: But the leather manufacturer has good reason to have you wiped out, doesn't he?

A: Sure he does. And the meat packer, too. They estimate losses we cause them in astronomical figures. And they raise a great hue and cry against us. But by the time they get into the act, our hosts are merely damaged carcasses and hides—we grubs have completed our cycle. This suits us, because damage shows up after what's left of our host (now the property of new owners) can no longer be treated for grubs!

Q: How about systemic drugs?

A: It astounds us that man has been so slow in taking this logical approach. There must be a peculiar fascination in dusting the damaged backs of cattle. Otherwise, how account for the long reign of rotenone?

Q: You think you can outwit systemic drugs?

A: It's not a question of outwitting drugs. Drugs can kill! But, as I said, knowing how is not doing. The problem of getting rid of us is one of overcoming common sense parasitism with economic incentive.

Q: I've just been handed a bulletin: One meat-packer offers to pay up to $1 per head on the cost of treatment for cattle with less than five grubs each. What is your opinion?

A: I refuse to answer, on the grounds . . .

soil sterilants for

CONTROL OF GRASS-TYPE WEEDS IN IRRIGATION SYSTEMS

By NAT TOLMAN, Chief
Irrigation Operations Division
U. S. Bureau of Reclamation
McCook, Nebraska

Grass-type weeds in irrigation systems are expensive to control and troublesome if not kept under control. There are several different ways operations and maintenance people have attempted to handle these weeds. Some try drowning them with irrigation water. In Nebraska, this is unsatisfactory, because there is no crop distribution system or water supply adequate to keep water in all laterals throughout the irrigation season.

Sometimes, the grasses are kept in control with mowing but ordinarily only the patrol roads and the tops of the laterals can be mowed. The mower cannot be used in the bottom of the ditch where the weeds cause the most trouble. Attempts are also made to get water through weed infested laterals by using shovels and pulling weeds by hand—the most expensive method. The grasses are sometimes controlled by re-ditching laterals or by using draglines to clean out the choked area. These methods are also very expensive. Use of weed burners is sometimes recommended, but again, propane burners are expensive to operate.

For the last three-and-one-half years, we have been testing grass weed control by use of soil sterilants. There are several different soil sterilants on the market but our experience has been almost entirely with the Du Pont compound, commercially sold as "Telvar" monuron weed killer. It was known experimentally as CMU. Test of application of soil sterilant began in the fall of 1954 and was followed with a spring application in 1955. The results were highly satisfactory, and limited field trial application was made in 1956. Sterilant was applied to 20 miles of lateral that year. The results again were satisfactory and in 1957, the sterilant was applied to 123 miles of lateral.

The spring application is the most satisfactory in this area. Sterilant should be applied to a freshly cleaned or burned lateral as soon as the frost is out of the ground in the spring. The results are poor if the sterilant is applied to frozen ground or laterals filled with trash and debris. Fall application seems to require about one-third more chemical for the same results.

A number of different rates of application have been tried. In the silty soils of the Republican and Kansas Rivers, control of grass weeds is achieved with 12 pounds per acre. On sandy soils, more sterilant is required, about 15 pounds per acre. On clay soils, an application of 10 pounds appears sufficient. The sterilant is applied with a rather low quantity of water, one pound of "Telvar" W to four or five gallons of water makes a satisfactory mix. We try not to apply more than 30 to 50 gallons per acre.

UNTREATED irrigation lateral near Superior, Nebraska, is choked up with grass-type weeds.

NEW TYPE of broad-jet nozzle is used to apply the soil sterilant.

U. S. Bureau of Reclamation Photographs

SOIL STERILANT treatment of wetted perimeter is effective in eliminating grass-type weeds.

The ordinary truck or jeep sprayer handles the sterilant mixture satisfactorily, provided the sprayer has a *good agitator*. This soil sterilant does not dissolve in water. It must, therefore, be kept in suspension by continuous agitation. For uniform distribution, the screens and nozzles should be cleaned about every hour to hour and a half of use. Sterilants are expensive and should, therefore, be applied with a hand boom and not be allowed to spread out over areas where a good cover of grass is needed. After application, water should be put into the ditch and allowed to soak the sterilant into the soil, rather than wash it through the lateral.

If 100 or more miles per year are treated, the cost will run about $45 to $50 per mile. The chemical is expensive, costing $3 a pound in large quantity orders. Last year, the costs of treating 123 miles of lateral were as follows:

Chemical—1480 lbs. at $3	*$4,440.00*
Labor	*1,036.00*
Mileage and equipment	*207.00*
Cost per mile	*$ 46.20*

One of the questions is how long the sterilant provides protective control. There is some carry-over but not enough to get along on an every-other-year basis. Perhaps if sterilant is applied for three successive years, control in the fourth year may be possible without application or with a one-half strength treatment.

Soil sterilant control is in line with the cost of 2,4-D on broad leaf weeds. It is also comparable to cleaning a ditch with machinery, but the results obtained through sterilant are more lasting than with burning or the usual cleaning methods.

After sterilant has been applied, the laterals do not "choke up" with grass after each little rain shower. We are particularly pleased with the sterilant since there have been no claims for crop damage by the sterilant washing out on farm lands, nor have there been any personal injujries. The sterilant has effectively controlled some of the most serious weeds, such as foxtail, fireweed, and barnyard grass.

RESEARCH ON UREA AND RUMINANT NUTRITION SUMMARIZED IN BOOK

UREA AND RUMINANT NUTRITION

A resume of nutritional studies to provide a better understanding of the role of non-protein nitrogen has been published by Du Pont. The illustrated book — *Digest of Research on Urea and Ruminant Nutrition*— summarizes reports ranging from the evolutionary position of the ruminant to the challenging research fields in ruminant nutrition still unexplored.

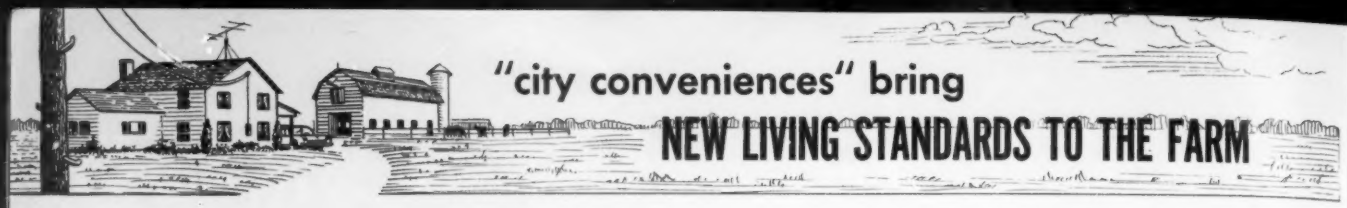
Much new knowledge on ruminant nutrition has been developed during the past 20 years at various laboratories and experiment stations, and the book attempts to summarize the principal findings, with particular emphasis on the effect of urea. Sections also deal with the effect of carbohydrates, trace minerals, proteins, and fatty acids. Also included is a bibliography useful for further study.

The illustrations were chosen to supplement the historic perspective presented and to illustrate the functioning of the rumen system. Included are photographs of ancient Egyptian, Etruscan, and Greek sculptures, as well as dissection drawings of the rumen of cattle and sheep.

The Library of Congress has accepted a copy of the *Digest of Research on Urea and Ruminant Nutrition*, and is giving it permanent shelf space. The book is available from: Editor, Agricultural News Letter, Du Pont Company, Wilmington 98, Del. The price is $2.50.

TECHNOLOGY BOOK AVAILABLE

Technology is advancing so rapidly that it may well "reshape the world in a single generation." This is the theme of *The Story of Technology*, latest booklet in the "This Is Du Pont" series. Tracing the history of technology from primitive beginnings, the 36-page publication describes the complex organization and vast investment required to maintain and extend the material, cultural, and spiritual well-being of the U. S. For a free copy write: Agricultural News Letter, Du Pont Co., Wilmington 98, Del.



"city conveniences" bring NEW LIVING STANDARDS TO THE FARM

A farming Rip van Winkle would not have to sleep 20 years to come back to a strange new world. In just about a decade, the transformation of the old farm homestead has been enough to make him feel he might have passed on to another world.

Perhaps the first thing to catch his eye would be the strange metal configuration atop the chimney or perched on a 50-foot steel tower. He would soon find that two-thirds of the nation's farms not only had the antenna but the television set to go with it (many of the families without TV are outside the present range of transmission, anyway).* As recently as 1950, only three per cent of farm families owned television sets. By 1954 the total rose to 36 per cent and now about two-thirds are so equipped. The Department of Agriculture estimates that farm families bought about 2.5 million TV sets between 1950 and 1956.

The rise in television ownership is but a symptom of the over-all change that has taken place: The virtual disappearance of the great differences between city and farm living standards. Time was when "living in the country" raised visions of cold, bleak homes, lack of sanitary facilities, smoky kitchens, and all the rest. But today, take the average farm house, transplant it to any city street, and no one would notice the difference.

Higher Cash Income

An important factor in making the change possible has been the rapid rise of income among the urban industrial workers. Higher incomes made possible greater cash expenditures for food and fiber grown on the farm. The average production worker in industry 20 years ago earned about $1.20 per hour at today's prices (actually he earned .63 cents, but the dollar was worth more then). A decade ago, he received $1.65 for the same amount of work and today he is averaging over $2.10. As industrial technology provided higher living standards for urban workers, money spread out to other segments of the economy in proportion. The farmer was no exception.

The first major step in the progress of farm living was the expansion of electrification—the source of power needed to run most of today's indoor machinery and appliances. Almost all farm families today have electricity. In 1920, only seven per cent had it and even in 1950, the figure was only 78 per cent. An equally significant measure of material progress on the farm is the speedy rise in the consumption of electrical power. Annual consumption of electricity on farms east of the 100th meridian rose from less than 2,000 kilowatt hours in 1948 to 3,650 in 1955. West of the 100th meridian—where electricity is widely used for irrigation machinery—the rise was from 5,310 to 8,180.

Improved Communication

The second link in the chain is improved transportation and communication. Automobiles, for example, gave the farm family more intimate contact with the ways of city life. About 80 per cent of the farm families own autos, the same as the national average. In 1950, it was 63, and in 1920, only 31 per cent.

Before World War II, only 15 per cent of the farm homes enjoyed mechanical refrigerators, today over 90 per cent. Home freezers are in about 40 per cent of farm homes, compared to 12 per cent in 1950. The freezer is, in fact, one of the important items in raising living standards and, as the USDA states, "many farm families evidently find it today a major economy in the preservation of home-grown food."

In recent years, there has been a sharp increase in telephone service on the farm, rising from 38 to 56 per cent between 1950 and 1958. Only 25 per cent had telephones in 1940. Of special significance is the fact that telephones are among the first "luxuries" to go when incomes decline or the economy is depressed.

Two-thirds of farm homes have running water. Installation of water systems is usually an individual project, rather than a community enterprise such as electricity or telephones. Despite the relatively high cost of installation, running water systems increased from a 43 per

**There are, in fact, more television sets on U. S. farms than telephones, and more TV sets in the country than bathtubs.*

cent level in 1950 (only 10 per cent in 1920).

Better appliances and more comfortable homes are not the only sign of better living on the farm. Community facilities, schools and hospitals, better opportunities for shopping, ability to take advantage of both urban and rural facilities within a wider geographic area, all have made major contributions toward erasing the traditional difference between the level of living in city and country.

Wipe out Differences

It is reasonable to assume that the advances in technology which are steadily raising the productivity and income of the nation will eventually wipe out the remaining differences between urban and rural levels of living. Within a few years, the transformation will not only startle our imagined agricultural Rip van Winkle, but even the practiced eye of the trained sociologist will find no appreciable differences in the social or economic advantages available to farm and city.

Characteristic of the changing social and economic pattern of rural areas is the virtually complete disappearance of the barefoot farm boy trudging to the one-room country schoolhouse. In 1910, there were more than 212,000 one-room schools in the nation; by 1950, the total was down to 60,000, and another four years later, there were only 43,000. Replacing the one-room rural school and the low average level of educational opportunity it offered pupils are the modern consolidated units with facilities and teaching staffs usually equal to urban educational institutions. The change is indicated by the fact that only 356,000 pupils were transported to schools in 1910, but the total in the 1950-51 school year reached 7.3 million, according to the Office of Education.

NEW TECHNIQUE FOR BETTER DETERMINATION OF PROTEIN QUALITY

By JOHN B. LONGENECKER, Ph.D.
Electrochemicals Department
E. I. du Pont de Nemours & Co. (Inc.)

A new research technique for determining the nutritional quality of protein sources—quicker and more conclusively than by previous methods—has been developed by Du Pont scientists. The procedure consists of determining the concentrations of essential amino acids in the blood plasma, before and after an experimental meal, then comparing them with the known requirements for these nutrients. Changes in the levels of the amino acids after a meal reflect the proportions and availability of each, thereby revealing the nutritional adequacy of the essential amino acid pattern of the ingested protein.

Any dietary protein with a shortage of one or more of the essential amino acids, or where one of these amino acids is not readily assimilated, will show an abnormal essential amino acid pattern in the blood plasma after feeding. The new technique is thus vastly superior to the chemical scoring system because it takes into account protein digestibility and the availability of the individual essential amino acids, as well as amino acid composition as determined by chemical or microbiological analysis.

Ion-exchange chromatography was used for determination of all essential amino acids except tryptophan, which was determined by microbiological assay.

In tests with wheat gluten, known to be deficient in the essential amino acid lysine, analyses of the blood plasma of dogs before and after test meals disclosed that lysine concentration in the blood plasma dropped constantly during the five hours after the meal. Conversely, the plasma concentrations of the other essential amino acids, plentiful in wheat gluten, increased for the first two or three hours, decreasing only after the fourth and fifth hours.

When the lysine deficiency of wheat gluten was corrected by addition of pure lysine, the plasma-lysine pattern after the meal was similar to that of the other essential amino acids. Similar results were obtained with gelatin tests before and after tryptophan supplementation.

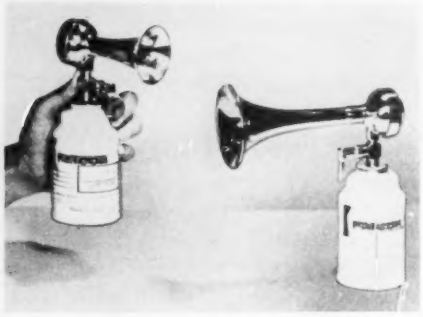
Although all of Du Pont's experimental work to date has been carried out with dogs, there are expectations that the blood plasma technique can be developed for use with humans. Thus, it may be possible to obtain information directly on the amino acid levels of human plasma, and eventually interpret their significance.

By the use of this new procedure, it has been demonstrated that both natural and supplementary amino acids are absorbed from the digestive tract into the blood stream at essentially the same rate. Thus, the addition of pure, essential amino acids to foods—such as bread and other wheat products—is an effective and practical method of correcting deficiencies.

new PRODUCTS AND APPLICATIONS

Safer and cheaper country roads can be made through the addition of 1.5 per cent neoprene synthetic rubber to asphalt. The neoprene adds elasticity to asphalt, thus helping hold the stone chips on the road surface. This cuts down the maintenance cost, while retaining traction against rubber tires. An additional safety factor derives from the surface's greater coefficient of friction than ordinary asphalt. In "panic-stops" at 40 miles per hour, there was a reduction of 12.5 per cent in the braking distance on neoprene-modified road surfaces.

* * *



A simple, low-cost, fire-warning device powered by "Freon" fluorinated hydrocarbon has many important uses on the farm. The device consists of a cylinder of "Freon" to which a horn is attached. Heat melts a plug, releasing the propellent with a blast of noise. Plugs are available with various melting points for different applications. A warning device suspended high in a barn will detect fire, or placement near heating devices can give warning of overheating. Du Pont manufactures the "Freon" used by several manufacturers in producing warning devices.

* * *

New underwear for outdoor farm work or hunting is made with "Dacron" polyester fiberfill, and provides comfort to temperatures as low as 20 degrees below zero. Because of the extreme lightness, the material permits free and normal movement and avoids the "packed" feeling of ordinary insulated clothing. The problem of bunching and mildew connected with laundering of insulated clothing is eliminated through use of the "Dacron" and nylon taffeta. In addition, these undergarments are surprisingly comfortable when used as pajamas by hunters outdoors or in unheated cabins. Because man-made fibers dry quickly, upkeep is simple.

* * *

A laboratory and pilot plant are being built by Du Pont to begin a program of investigation of the polyethylene film field. It is expected the study will lead to commercial manufacture of polyethylene film, which is used on the farm in many applications. During the past few years, technological advances, particularly in improved resins, which have widened the market for polyethylene film, have indicated desirability of exploring the field. The laboratory, which will be built [illegible]nge, Tex., is expected to be ready for operation late in 1959. Du Pont will continue to supply [illegible]thylene resin to the film industry.

A nylon hose coupler which outwears standard metal fittings four to one is made possible by adaptation of a special design to Du Pont's "Zytel" nylon resin. The new coupling is light, rust-proof, and turns easily over metal threads of faucets or other connectors. Nylon is easily colored, lending a style note to garden hose. Tests show the nylon fitting remains watertight despite rugged use. Surging water at pressures up to 325 pounds was run through for 30 minutes without breakdown. ("Shurlok" hose coupler is made by W. D. Allen Manufacturing Company, Bellwood, Ill.).

* * *

An "air-conditioned" neoprene synthetic rubber boot with an easy-to-use, one-button closure protects feet and shoes in mud, dirt, and snow. Ridges molded inside the one-piece boot produce a bellows-like action with every step, thus circulating air through the boot. A button and strap, molded as part of the boot, provide easy closure, even with cold-numbed fingers. Because there is no fabric liner, the boots are easy to slip on and off and also simple to keep clean. Neoprene resists barnyard acids, chemicals, grease, and oil. (Made by Tingley Rubber Corporation, Rahway, N. J.).

* * *

A mop combining two types of synthetic sponge is now available to make easier many farm and home floor-cleaning chores. The cellulose sponge section picks up water and loose dirt quickly and easily. A plastic sponge strip of tough urethane foam is abrasive enough to dislodge stubborn spots. Both sponge surfaces function as a unit and rinsing is accomplished by a new finger-tip-touch squeezer. The combination of materials used was developed after several years of research and testing. The cellulose sponge holds up to 20 times its weight in water. (O-Cedar Division of American-Marietta Co., Chicago, Ill.).

* * *

Quick, permanent repair of complete breaks and circumferential splits in cast-iron or asbestos-cement pipe on the farm can be made with a broken-pipe clamp using neoprene synthetic rubber. The device consists of two stainless steel bands with sheet neoprene liners. It is cinched around the broken pipe by lug bolts. Interlocking finger joints in the liner permit the neoprene to seal, regardless of minor variations in pipe diameters. All removable parts of the clamp are interchangeable. No caulking is required and, normally, repairs can be made without shutdown. (Adams Pipe Repair Products, El Monte, Cal.).

INSTRUMENTATION ... FOR THE BETTER LIFE

By HENRY B. DU PONT*
Vice President and Director
E. I. du Pont de Nemours & Co. (Inc.)

Through the summer of 1876, the Centennial Fair at Philadelphia, with the theme of "Power," indicated to all the world that America was on its way to its destiny as the greatest industrial nation on earth. It symbolized that the simple agrarian economy of the first hundred years was over; that the future lay in development of machinery which could multiply the effort of each man a hundredfold. The mechanical revolution was well on its way, and within the next few years it achieved a miracle of production which astonished everyone. For instance, the year the Civil War ended, industrial output in the U.S. was two-thirds that of Britain; by 1900, it was twice as great.

Production gains of such magnitude were necessary to meet the needs of a population which, between 1865 and 1900, increased from 36 million to more than 76 million, most of it through successive waves of immigration. Much of the country in 1900 would have been undernourished had agriculture and industry retained the tools and methods of 1800.

Age of Machinery

In the first years of the new America, when 10 men sat down at dinner, the food represented the full-time effort of most of them. By 1900, production of farm goods and other consumer products was 150 per cent over that of 1850, and within 10 years, would rise another 50 per cent. On the farm, the reaper, the steel plow, and the steam harvester had supplanted the peasant methods of former centuries. The age of machinery had been born, and, under our free institutions, it had flourished. America in a few decades witnessed the transformation of a wilderness into a rich, productive, and dynamic nation. Each year saw new advances in industrial output and the rate of growth continued at an average of two to three per cent a year. American genius for mechanical contrivances and technical innovation had, by 1900, made industry the nation's major activity, with agriculture's demands for manpower constantly decreasing.

Machinery was the instrument which characterized the first great stage of American industrial development. Today, we are on the doorstep of another era of equal significance. If the latter half of the 19th century were the age of machines, the latter half of the 20th may well be designated by the historians as the age of instrumentation—in which we developed machines to operate machines more skillfully and more efficiently than ever before.

Familiar Devices

Instrumentation is demonstrated in such a familiar device as the automatic washing machine. Instruments assess temperatures, pressures, speed, and weight and, as each measurement is taken, translate the data into a control mechanism so that the cycle proceeds in automatic sequence. Instrumentation is actually the outgrowth of the blending of science and industry. Instruments are essentially devices used for measurement, and measurement of physical phenomena in terms of quantitative record is the essence of science itself.

Early scientific instruments were largely devoted to telling man what he needed to know, leaving further action to human hands. Instrumentation carries us further. It is an integral part of industrial processing, actuating control mechanisms, without human intervention. This permits us to use highly complex production processes and to control them largely through automatic devices.

Measurement to Action

Although automatic control, made possible by modern instrumentation, saves labor, it is not primarily just a labor-saving device. Without it, many intricate industrial processes could not operate, at least not efficiently enough to maintain quality even at higher cost. To a degree which is little realized, the manufacture of everything from a suit of clothes to a guided missile involves continual measurement and the continual translation of the results into actions.

**Excerpts from an address before the Instrument Society of America, Philadelphia, Pa., Sept. 18, 1958.*

Instrumentation finds its most significant role as a vital and creative component of modern technology, and it is here that it shows the greatest promise for the future. Innovation in the field of automatic production processes has already developed a number of new principles. In the chemical field, it has reached such a point that the more modern plants are in themselves instruments whose function is wholly continuous and automatic. In one of the newer complex processes, instruments make no less than 7,000 check readings continually as the product flows through.

Extension of Technology

Instrumentation represents no new monster to be feared. It is a logical and evolutionary extension of technology, a force which brings together machinery and equipment, skills and techniques; men, money, and methods. It signifies not job displacement, but job opportunity. For example, in the chemical industry, among the leaders in adopting instrumentation, installation of automatic processes has been accompanied by a steady rise in employment.

The major significance of the entire instrumentation development is not scientific or economic, but social. Its successful expansion will, in large part, determine what kind of a world we will live in 20 years hence—whether we advance in accordance with our dreams, or retrogress through our incapacity to meet demands. In the middle of the past century when production was low, the average American youngster attended school less than six years. At the other end of life, the question of retirement was, for the average person, a remote dreamland reserved for merchant princes; though most Americans, merchant prince and his clerks alike, stayed in harness until they were no longer able to perform their duties.

Working Life Shortened

Our aspirations for ourselves and our children have led us to a far different way of life. We have elected to dedicate a part of the gains received from advancing technology to shortening the period at each end of our working lives. Our children are in school for 12 years, and a large and increasing number of them for four years longer, or even more. A substantial number of our people retire at 65, and many at 60. With a working force of some 65 million and a population of some 180 million, each employed person, regardless of his personal situation, is supporting himself plus two others.

In terms of production only, the goods-producing industries must provide enough to sustain, in addition to their own work forces, the large and growing army of people whose functions are in the nature of service—the professions, the so-called maintenance trades such as the garage mechanic and the paper hanger, and those engaged in personal care, as represented by the barber and the cleaning and pressing shop. In 1910, the ratio of production workers to those in service functions was three to one; today, it is one for one, including some eight million government workers and a large military establishment.

In the next 20 years, the total population is expected to increase by perhaps 40 per cent. The population of working age, however, will increase by a third; these are people already born and, therefore, subject to count. The labor force in manufacture and agriculture, with more people going to college than ever and more going into service work, is expected to increase significantly less.

Sacrifice without Technology

Longer hours could supply additional output, but we relinquish our gains in leisure time very reluctantly. It is inconceivable that the trends toward shorter hours, longer vacations, and early retirement will be reversed or that the tendency toward longer education will be any the less. If technology does not keep advancing, then we will have to sacrifice somewhere. We will have to make sacrifices either in leisure time, in the number of persons available for services, or in our living standards. We cannot make headway by short-changing one side of our economy at the expense of the other.

Continued growth in the direction of improved technology is an absolute essential if we are to maintain even our present-day rate of development. And the conditions necessary to this growth must be provided just as surely as the conditions of soil and atmosphere must be provided to produce a field of grain.

In modern instrumentation lies our hope for the extra hands to do the work, the extra effort to make our work effective, the extra energy that will be needed to power our entire economy in an upward climb.

NITROGEN AIDS PINE SEEDLING GROWTH

By all measures of the loblolly pine seedlings in the nursery bed and of their performance in the field, it has been shown that liberal use of nitrogen produces larger, sturdier seedlings which grow faster in the field than seedlings from unfertilized beds. The quality of seedlings can be improved by late application of nitrogen a few weeks before lifting. In contrast to nitrogen, the use of phosphorus and potassium has not improved the quality of the planting stock nor its performance in the field. Early survival in plantations usually depends more upon the seedlings' resistance to drought than anything else, and drought resistance is related to the ability to form new root tissue promptly after planting. Nitrogen treatments have a significantly beneficial effect upon new root development, while the potassium and phosphorus treatments have the opposite effect. — AGRICULTURAL EXPERIMENT STATION, MISSISSIPPI STATE COLLEGE.

DAIRYMEN TEST COWS ON PASTURE FOR ENERGY USE

A device for measuring the respiratory gases a cow exhales is helping scientists learn more about the cow's use of energy. The device is designed to find out why a cow uses more energy to maintain her body on pasture than in a barn, and the extent of this extra energy use. Samples of inhaled air, exhaled gases, and urine are analyzed to determine the amount of heat produced by the cows. Results are used to compute the number of calories used by the animals, or the amount of work done in grazing. Recordings are made under varying temperature, wind, and sunlight. Energy used on lush and short-grass pastures is computed to learn how heat production may vary under these conditions. — UNITED STATES DEPARTMENT OF AGRICULTURE.

PLASTIC GREENHOUSE CONSTRUCTION

An experimental plastic greenhouse, 18 feet wide and 60 feet long, was built to explore problems of construction, design, and operation. The house, complete with a heating system and exhaust fan, cost slightly less than $700. In private construction, this cost may be reduced in many ways. It is estimated that $200 per year will pay for replacing the plastic and provide fuel for heating the house after the first year. — AGRICULTURAL EXPERIMENT STATION, MISSISSIPPI STATE COLLEGE.

QUALITY OF LYSINE-SUPPLEMENTED BREAD

There is no difference in the taste, texture, or appearance of white bread, cakes, and doughnuts supplemented with the essential amino acid, lysine, nor is there any increase in the "staling" rate of supplemented breads. In tests, supplemented white bread samples, containing various amounts of lysine, were mixed with unsupplemented samples and distributed to a taste panel. The panel found no difference in the taste between white breads, supplemented with lysine at recommended levels (0.25 per cent L-lysine monohydrochloride), and the unsupplemented samples.

In addition, lysine-supplemented sweet and white breads showed no variation in loaf volume. This was also disclosed in commercial bakery tests with standard white bread, supplemented at recommended levels.

Test cakes were prepared and baked according to common household recipes, using both baking powder and baking soda. Panel members judged the samples for over-all quality, and for general appearance, taste, and eating quality. The tests disclosed no significant differences in taste, texture, or color between the unsupplemented cakes, and cakes supplemented with lysine at even twice the recommended levels. — NUTRITION NEWS SERVICE, DU PONT COMPANY.

CONTROL OF PEPPER FUNGUS

Anthracnose of pepper, caused by *Collectotrichum piperatum*, leads to insidious but meaningful losses in pepper fields in Delaware. Losses in excess of 50 per cent of marketable fruit have been reported but more often losses are less than 5 per cent.

C. piperatum can survive in refuse in or on the soil surface in the form of stromatic bodies containing imbedded conidia for at least nine months under Delaware conditions. Furthermore, the surviving fungus is capable of contaminating and causing infection on pepper seedlings and fruit. *C. piperatum* and *C. capsici* were found capable of surviving in or on dry pepper seed for at least nine months. Acervuli could clearly be distinguished on the outside of the seed coats, and strands of hyphae were found ramifying various portions of the internal seed tissues. Conidia were found in abundance clinging to the seed coat. These were, however, found to be non-viable.

Certain commercial fungicides were found to be effective in reducing the fruit rots caused by *C. piperatum* and *C. capsici*. Under high disease incidence, zineb* or maneb† applied at 14-day intervals, beginning approximately four weeks after the peppers had bloomed, reduced significantly the amount of disease and gave greater marketable yields.—AGRICULTURAL EXPERIMENT STATION, UNIVERSITY OF DELAWARE.

Du Pont manufactures zineb fungicide under the trademark "Parzate".
†*Du Pont manufactures maneb fungicide under the trademark "Manzate".*

MANZATE LEADS IN POTATO FUNGICIDE TESTS

The last three seasons have been excellent for screening of potato fungicides because 1955 was a year with relatively little disease; 1956, an excellent late-blight year; and 1957, a good early-blight year. These conditions made possible screening fungicides for plant injury in the absence of disease and for their relative effectiveness against each disease alone. "Manzate"* maneb fungicide stands out as the most desirable fungicide because it consistently resulted in high yields. — PENNSYLVANIA STATE UNIVERSITY.

Du Pont trademark.

DISTRIBUTION OF FERTILIZER THROUGH SPRINKLER IRRIGATION

There has been considerable interest in the practicability of distributing fertilizers through irrigation systems, particularly through sprinkler irrigation systems. Six tests were made to evaluate effectiveness of two systems for introducing fertilizer materials into solution in irrigation water applied with a sprinkler system. Three solid, water-soluble, nitrogen-source materials were used. Both the auxiliary pump and the closed tank systems may be used to inject the fertilizer into solution in water being applied through a sprinkler system. While the auxiliary pump system resulted in a more uniform concentration of the fertilizer material distributed over the area, the closed tank system produced the same concentration of fertilizer elements in the solution passing through all sprinklers on a lateral line. Ordinary, water-soluble fertilizers may be applied successfully through sprinkler irrigation systems. A reasonably uniform concentration of fertilizer elements resulted from distributing soluble fertilizer through a sprinkler irrigation system. For practical purposes, it may be assumed that the fertilizer materials will be applied to the soil as uniformly as is the water. —AGRICULTURAL EXPERIMENT STATION, UNIVERSITY OF ARKANSAS.

LOWER COST IN FERTILIZING TOBACCO

To help cut costs of fertilizing tobacco, experiments in Connecticut and elsewhere have been restudied. Oil seed meals are expensive. Less expensive sources of nitrogen, improved methods of fertilizer placement, and careful timing of applications, have helped cut costs and given good yields of average or better quality. Synthetic organic and inorganic nitrogen materials are suitable fertilizers for tobacco when properly used, and these materials are cheap when compared with the oil seed meals. Nitrogen is the most costly of the fertilizing materials used and is easily lost from the soil. The choice of phosphate and potash fertilizers can safely be made on the basis of relative price from among several good sources. — CONNECTICUT AGRICULTURAL EXPERIMENT STATION.

Availability of methionine hydroxy analogue calcium for poultry feed, at a cost reduction of about 20 per cent over methionine, has raised the question of relative efficiency of these two products. Experimental procedures critical enough to resolve this question unequivocally do not exist. There is, however, a large body of evidence to indicate that the analogue (90 per cent purity) has a greater activity when compared to DL-methionine (98 per cent purity) than is indicated solely by molecular structure.

It is a recognized fact that, in the presence of amino nitrogen donors, the analogue molecule is fully convertible to methionine activity with the exception of the calcium portion. A pure calcium salt would be equivalent to approximately 88 per cent natural (L) methionine. A salt having 95 per cent purity would be equivalent to 83 per cent L-methionine. A 90 per cent salt would be equivalent to 79 per cent L-methionine.

Although the analogue is prepared as an equal mixture of the D- and L-isomers, the conversion of either to methionine is a simple reaction with no evidence of loss occurring. On the other hand, the conversion of the D-isomer of the amino compound, DL-methionine, presents more of a physiological problem, and there is evidence of some loss during conversion.

Essentially Equivalent

How much is lost? This is where the necessary precision is lacking. Were the conversion of D-methionine no more than 61 per cent efficient, the available methionine activity of the compound would be no more than 79 per cent of its weight.* It has been claimed the conversion of D-methionine is approximately 70 per cent effective, in which case the methionine activity of DL-methionine (98 per cent) would be about 83 per cent of its weight.

In feeding trials, practical growing diets supplemented on an equal weight basis with DL-methionine (98 per cent) and methionine hydroxy analogue calcium (95 per cent) resulted in identical performance. This research program covered the better part of a year, studied four different diet combinations in nine individual experiments, and required over 13,000 chickens in battery, floor pen, and field facilities for a total of 33 comparisons.

The only conclusion to be drawn from these studies is that the two methionine sources are essentially equivalent on an equal weight basis when used as supplements in diets typical of commercial broiler production. Therefore, "Hydan", having 90 per cent of the active compound instead of 95, must logically be equal to 90/95 of the former analogue, pound for pound, and similarly related to DL-methionine.

Potent Methionine Source

Experiments demonstrate "Hydan" is effective in overcoming symptoms of methionine deficiency with only the slightest suggestion that equal amounts of analogue or DL-methionine are more effective.

On the basis of such evidence of the effectiveness of each compound, Du Pont offered both products for sale in May, 1957. A continuing program of research has further explored the two synthetic sources of methionine on the bases of manufacturing economy, biological activity, and consumer use-cost. The result of this is "Hydan" Feed Supplement (methionine hydroxy analogue calcium 90 per cent), a potent source of methionine at a price consistently less than natural methionine.

TABLE. The Relative Effects of "Hydan" Feed Supplement and DL-Methionine When Added to High-Efficiency Broiler Rations at the Rate of **One Pound Per Ton** Using Male Chickens in Floor Pens.

		9 Week Results	
Treatment	No. of Chicks	Weight (Lbs.)	Feed/Weight (Lbs.)
Basal 133	70	3.57	2.45
+ 0.05% DL-Methionine	70	3.74	2.33
+ 0.05% "Hydan"	70	3.68	2.32
Basal 112C	70	3.60	2.33
+ 0.05% DL-Methionine	70	3.76	2.13
+ 0.05% "Hydan"	70	3.77	2.16
Combined Basals	140	3.58	2.39
+ 0.05% DL-Methionine	140	3.75	2.23
+ 0.05% "Hydan"	140	3.73	2.24

**100 per cent x 49/98 L-methionine + 61 per cent x 49/98 D-methionine = 79 per cent methionine activity.*

cooperative study shows

EFFECTS OF UREAFORM ON ORNAMENTALS

A three-way cooperative study has been made during the past two growing seasons on ureaform nitrogen fertilizer for ornamental plants. Since ureaform is slowly soluble in water, making nitrogen available through a slow process of hydrolyzation, it provides a "controlled" rate of fertilization for plants, as contrasted to water soluble urea. Preliminary results show the controlled nitrogen helps create hardier plants, more able to resist winter damage. Plants are of better general quality, larger and more compact.

The experiments are carried on at the Laurel Lake Nurseries, Salemburg, N. C., with the cooperation of the North Carolina State College and the Du Pont Company. The nursery has uniform, high-quality soil, as well as uniform hollies, azaleas, and camellias from the same parent stock. A total of 40,000 plants were provided. The operations are under expert supervision, with all needed facilities, including irrigation and pesticidal programs.

Four Fertilizers Used

The experimental design, measurement, and evaluation were made by the staff of the college, with electronic equipment to speed the data processing. Du Pont provided two of the commercial fertilizer compounds used, "Uramite" containing ureaform and "NuGreen" containing urea, as well as a research grant.

Plots were laid out early in 1957 with Japanese dwarf hollies and Chinese hollies, as well as azaleas and camellias. Four levels of supplemental nitrogen were applied: 50, 100, 150, and 200 pounds per acre. Four sources were used: ammonium nitrate; sodium nitrate; "NuGreen" fertilizer compound, containing 45 per cent nitrogen; and Du Pont "Uramite" fertilizer compound, with 38 per cent nitrogen.

The soluble fertilizers were applied four times on each plot, the "Uramite" only once, in April. Adequate phosphorus and potash were supplied in applications of 1000 pounds of 5-10-10 in April and June. Results are summarized in the table given below.

The evidence is that leaf drop of azaleas was much less severe with a continuing supply of nitrogen. Observations elsewhere have also indicated that nutrient balance is involved in the severity of leaf drop. To further pursue this field, a separate study was undertaken in 1958. Plots of uniform azaleas were treated with three rates each of nitrogen, phosphorus, and potash, and with two sources of nitrogen (ammonium nitrate and "Uramite"). It is expected that the study will provide useful information on the effects of fertilization on azalea growth and lead to a reasonable insight into causes of leaf drop.

THREE-YEAR-OLD Burford holly, fertilized with 263 pounds of "Uramite", is shown by J. S. Howard, Laurel Lake Nurseries.

Preliminary Data on Japanese Holly (*Ilex crenata* var. *conuexa*), 1957, with varying rates of supplemental nitrogen from "Uramite" fertilizer compound and a soluble source of nitrogen.

	"Uramite" lbs. N/acre				ammonium nitrate lbs. N/acre			
	50	100	150	200	50	100	150	200
Plant size								
height (inches)	12.65	11.35	13.45	13.40	9.95	9.70	9.90	11.15
diameter (inches)	15.15	13.50	15.70	15.85	13.35	12.95	12.65	14.15
*Winter color	—	†	†	†	—	—	—	†
*Winter hardiness	†	†	†	—	—	—	—	—
*Plant uniformity	†	†	†	†	—	†	†	—

**Data are summaries of subjective evaluations; (†) indicates satisfactory and (—) indicates unsatisfactory performance.*

Improved Markets From CURING BACON WITH CYCLAMATE

Tastier bacon that can be cooked golden crisp twice as fast, with half the chance of charring, may raise the popularity of bacon as a breakfast dish. The "secret" lies in a new method of curing, using sodium cyclamate as a sweetener, instead of sugar. Sugar chars at relatively low temperature, requiring a fairly low heat and constant vigilance to keep it from becoming overdone.

Sodium cyclamate is not affected by cooking heat and higher flame can be used to cut cooking to three minutes. Furthermore, it can improve flavor by increasing the sweetness range, whereas the addition of more sugar adds to the charring danger. Even after it is done, cyclamate-cured bacon can be cooked three to four times longer than ordinary bacon without charring or spoiling. The rendered fat of cyclamate-cured bacon is comparatively clear and more suited to reuse. Nor is there brown residue in the pan, as with cured bacon.

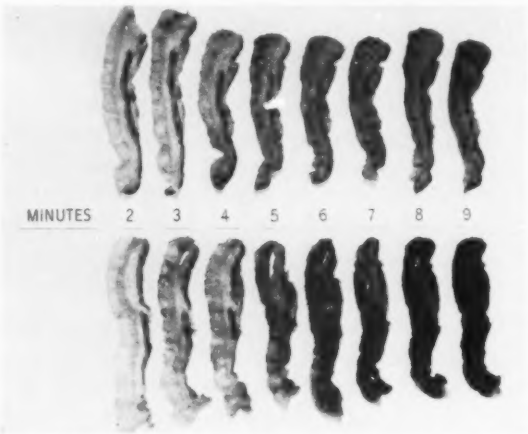
Many a housewife who has turned to other products for breakfast may be tempted back to bacon if the advantages of cyclamate-curing are pointed out to her.

Improved cooking qualities of cyclamate-cured bacon are evident in other dishes. For example, preparing bacon and melted cheese dishes is easier because of the reduced danger of burned bacon—while the cheese is still unmelted. The same holds true of other broiled dishes using bacon. Another potential market is in institutional cooking, since the extension of the cooking time-temperature range makes cyclamate-cured bacon more suitable for large-scale preparation.

Sodium cyclamate is manufactured by Du Pont and is sold under the trademark "Cylan". It will not react with bacon, ham, and other cured pork products, or char at temperatures considerably higher than those encountered in cooking. Because it is 33 times as sweet as sugar, smaller quantities are used, which means lower handling and shipping costs. At equivalent levels of sweetness, cyclamate-cured bacon cannot be distinguished in taste from sugar-cured. Color and keeping qualities are not affected.

Extensive pharmacological and clinical studies by both industrial and government workers have demonstrated the safety of sodium cyclamate for human consumption. It has been a standard item of commerce for several years in the food industry, used primarily in special dietary foods and beverages because it is non-nutritive. At the normal consumption of bacon, the average daily intake of sodium cyclamate will be about .001 of the amount considered to be the maximum safe daily level. Extensive tests prove that sodium cyclamate is stable and retains its sweetness during curing or cooking.

A number of meat packers have already placed cyclamate-cured bacon on the market. This process is suitable for both small-scale and large-scale curing. It can be used in dry cures and injection pumping. Prepared mixtures containing "Cylan" and the other ingredients for curing are available from supply houses.



COOKING TEST shows effect of various lengths of cooking time on cyclamate-cured (top) and sugar-cured (bottom) bacon.

LOW N CUTS FOREST FERTILITY

A reputation for low fertility among forest soils is not always justified. Forest areas where rainfall is high and tree growth is rapid may have a total nitrogen content (in soil, litter, and vegetation) as high as eight tons per acre, comparable to some of the best farmland areas in California. But total nitrogen may drop as low as one ton per acre in low-rainfall areas, where tree growth is sluggish and timber yield is meager. Forests, like any other crops, need their share of nitrogen in order to produce the most growth in the shortest time. Further research may show if fertilization can stimulate growth on poor forest sites.—COLLEGE OF AGRICULTURE, UNIV. OF CALIFORNIA.

Farmers Ask About . . . .

Q: Who invented food canning?

A: **Nicolas Appert, French wine bottler, using bottles, in 1809. The first metal "canister" was made in England by Peter Durand in 1810.**

* * * * *

Q: What has happened to value of farm land in recent years?

A: **The average dollar value per acre has tripled in 15 years.**

* * * * *

Q: How much food does a baby consume?

A: **It is estimated that during its first year a baby eats 765 cans of baby food, 337 cans of evaporated milk, 22 pounds of sugar and syrups, 30 cans of juices, plus fruit, crackers, bacon, potatoes, eggs, etc.**

* * * * *

Q: How rapidly is the product list of the chemical industry growing?

A: **Some six to seven thousand products have been added in the past 25 years, averaging about 270 per year.**

* * * * *

Q: How big is the cut flower business in the U. S.?

A: **The 10 major producing states produced about $56 million worth at wholesale in 1957. Chrysanthemums led with $17.2 million and carnations were second with $15.5 million, according to the USDA.**

* * * * *

Q: Did Du Pont cut its spending for new construction?

A: **No, construction of new and expanded plant facilities rose to $232 million in 1958, about 10 per cent over the previous year.**

* * * * *

Q: How long does dry rot fungus of gladiolus survive in soil?

A: **Various studies have shown survival from five to 15 years.**

* * * * *

Q: How many farms are too small for profitable operation?

A: **Dean Earl L. Butz of the Purdue College of Agriculture says half the farm units are too small or inefficient to yield their owners a decent living standard.**

* * * * *

Q: Are "convenience" foods much higher in cost than regular items?

A: **A USDA pilot study found that it would have cost only 61 cents more to buy $100 worth of serviced than unserviced food.**

* * * * *

Q: How do weeds affect uptake of nutrients?

A: **Adversely. For example, corn grown with weeds at the Massachusetts Experiment Station took up only 44 per cent as much K and 53 per cent as much N as corn grown alone.**

* * * * *

Q: What savings are realized from use of monuron weed killer in citrus groves?

A: **About $44 an acre, according to the University of California, since monuron costs about $16 per acre, conventional sprays $60.**

* * * * *

Q: What has the decline in butter consumption done to annual milk consumption?

A: **Per capita milk consumption has dropped 100 pounds in 30 years. Total milk consumption has, however, risen since 1953.**

* * * * *

Q: Does manner of feeding calves affect presence of stomach worms?

A: **Milk-fed calves have shown fewer stomach worms, but the reason therefor is not known.**

* * * * *

Q: Are farm values still rising?

A: **Decidedly. The USDA reports U. S. farms were worth a record $119 billion last July, a rise of over $6 billion in one year.**

* * * * *

Q: How effective have chemicals been in reducing insect damage?

A: **According to the Secretary of Agriculture, insects now destroy only 12 per cent of farm production, compared to one-fourth 20 years ago.**

E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
1007 Market Street
Wilmington 98, Delaware

RETURN POSTAGE GUARANTEED

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . *THROUGH CHEMISTRY*

PRINTED IN U. S. A.